

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER

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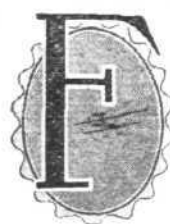
INDEX AND TITLE PAGE FOR VOL. XII.
The 8-page Index for Vol. XII of "FLIGHT" (January to December, 1920) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1/- per copy, post free.

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

May	...	Seaplane Contests on Lake Garde, Italy
May 15	...	Entries Close for Schneider Cup
May 21	...	U.S.A. National Balloon Race, Alabama
June 10	...	Race, Lugo-Trieste-Trieste-Lugo
July 6	...	Entries close for Aerial Derby
July 16	...	Aerial Derby
July 29-31	...	Jacques Schneider Cup, Venice
Sept. 4-11	...	Brescia Races
Sept. 5	...	Pulitzer Trophy, Detroit, U.S.A.
Sept. 18	...	Gordon Bennett Balloon Race
Sept. 25-	...	
Oct. 2	...	Aero Exhibition, Prague
Nov.	...	Paris Aero Salon

EDITORIAL COMMENT



FOR several years we have pointed out in these columns the great advantage, to a country like ours, of the use of successful amphibian machines. Not only will their use avoid the tedious journeys from town to aerodrome, which must of necessity be some distance away, but in many instances cities which have no suitable aerodrome, and which could only at great expense provide it, already have the sea, a river, or a lake adjoining, which makes the finest possible natural "aerodrome." So far this appears to point to the seaplane pure and simple. The amphibian, however, will score in many cases over the seaplane. It can, for instance, safely make journeys over land for distances which would be quite outside the scope of an ordinary seaplane. It is true that the carrying of the land gear entails the sacrifice of a certain amount of paying load, but on the other hand the many advantages of the amphibian machine tend to counterbalance this fact.

It is a matter of great satisfaction that the Air Ministry have given evidence of their belief in the amphibian type of machine by, firstly, holding a competition for this type, and following this up by alighting tests on the Thames. The scope of the latter series of tests was widened considerably when, on April 29, the Vickers "Viking" left the Thames for Paris, carrying on board Col. Beatty of the Air Ministry and General Sir Frederick Sykes, Controller of Civil Aviation. The machine, which is stationed at Croydon, flew up to town and alighted on the Hard at Doulton's, near Lambeth Bridge. Leaving again at 3.30 p.m., the "Viking" arrived in Paris and alighted on the Seine at 6.20 p.m., having taken 2 hours 50 minutes for the journey. Considering that the departure and arrival occurred in the centre of the two cities, and not at aerodromes situated the better part of an hour's journey outside them, this is probably one of the fastest London-Paris journeys ever made. If a business man had been making the journey, his time from his office in London to the Paris office would have been just over three hours. We congratulate the Air Ministry, Messrs. Vickers, Ltd., and Messrs. Napier and Son, the makers of the

"Lion" engine, on the achievement, and hope that this new "Milestone" in commercial aviation may prove the forerunner of regular services between the two cities direct. No doubt later other routes will be tried, such as the London-Amsterdam and the London-Antwerp or even London-Brussels, not to mention routes in the United Kingdom.

The Empire and the Air

It was almost inevitable that the questions of Imperial communications and defences by air, as well as commercial aviation, should be raised at the Imperial Conference which is to be held in June of this year. The vital importance to a far-flung Empire like ours of not letting slip any opportunity of availing ourselves of the possibilities which the air offers have been impressed by us persistently for the last decade. It is to be hoped that at the Imperial Conference an opportunity will be given for a thorough discussion of the Imperial aspect of aviation in all its phases.

This will be the first time in history that it has been possible to study this vital subject at such a conference, and if the proceedings are properly handled we feel sure that nothing but good can come from such a discussion. Incidentally it may be pointed out that aircraft will in all probability be the means of making easy the holding of such conferences much more frequently than has hitherto been possible by reducing the times occupied in getting to London and back again of the representatives of our various Dominions. The closer co-operation which more frequent meetings of this nature will ensure, will be of inestimable value to the Empire, and its vital importance needs no emphasis. We sincerely trust that an opportunity will be given of discussing not only the military aspect of Imperial aviation, but that the Air Ministry will also have the fullest information—and a constructive policy—to place before the Premiers in relation to commercial aviation.

If flying is full of possibilities at home it is still more so in our Dominions, where transport facilities are not always developed to the extent that might be desired and where consequently aviation offers a tremendous impetus for opening up communication, and through that to land development. Is the Air Ministry ready to impress upon the Conference all that flying may mean to the Dominions, and is it prepared with a policy for Imperial Inter-communication by air? Is the Air Ministry in possession of data which definitely show that airships are of no use in commercial life, or, if the contrary be the case, will the Air Ministry be prepared with suggestions and proposals whereby airships are used for the sphere of activity to which they are most suited: Long-distance journeys between the Mother Country and the Colonies and Dominions? We wonder; but, frankly, we are not very optimistic. Capt. Guest recently stated in the House that he had "inherited" the policy of the Air Ministry. We are afraid that his heritage is somewhat microscopic. Personally, we have never been able to discover that the Government had a policy as far as the air is concerned. It is to be hoped that the representatives from overseas will bring with them that "hustle" which apparently is lacking at home, and will force our lethargic Government to that declaration of policy which the country has hitherto been denied.

Thick Wings with Flaps

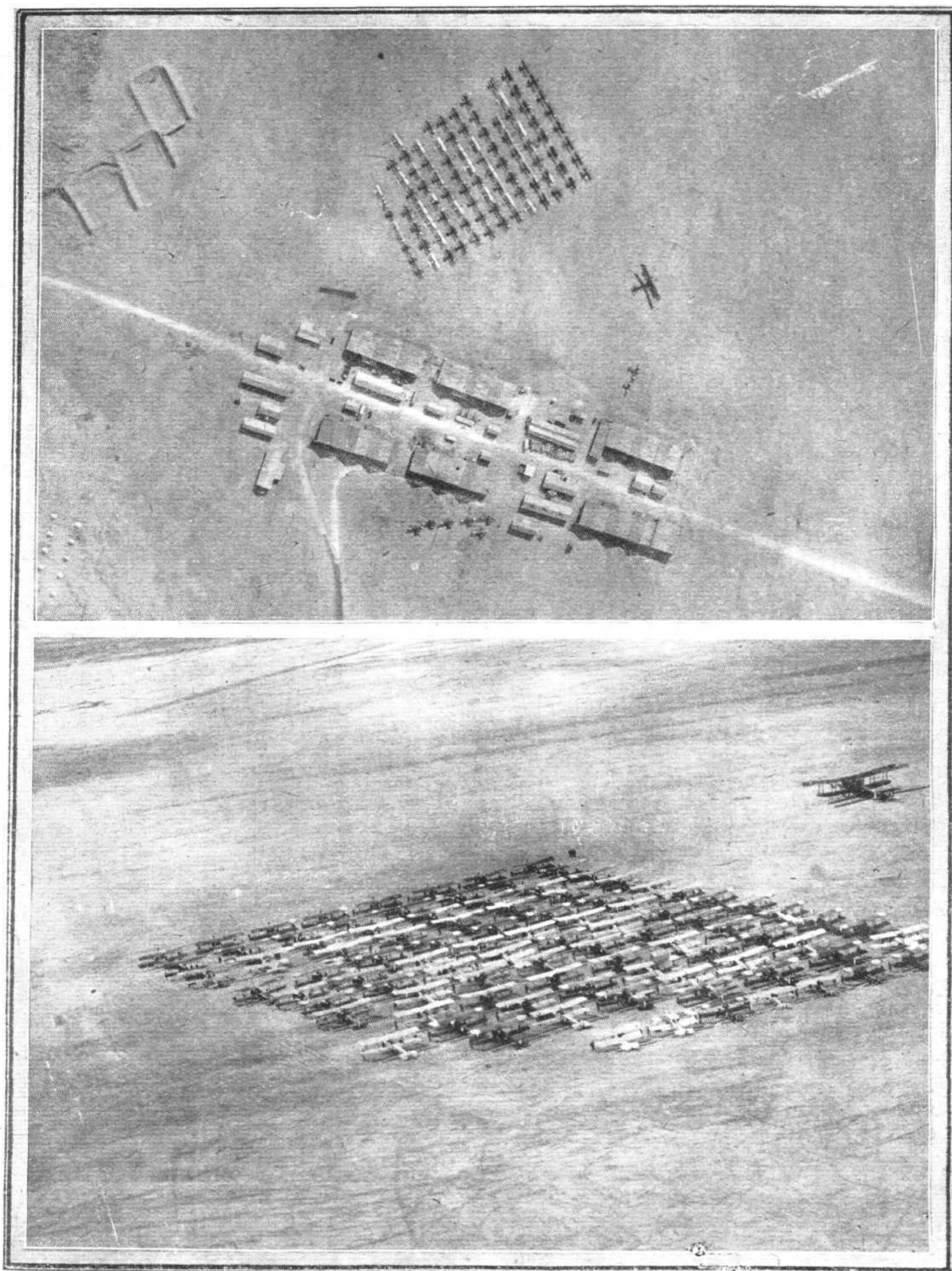
Elsewhere in this issue we publish a series of interesting characteristic curves of American wing sections, representing results of tests for the Glenn Martin Co. at the Massachusetts Institute of Technology. In view of the paramount importance of wide speed range in commercial aeroplanes, these results will be studied with more than ordinary interest, giving for the first time results of exhaustive tests on this subject. Exhaustive, that is to say, as regards lift, drag, and lift-drag ratios. So far as we are aware no tests were made on the movement of the centre of pressure in conjunction with the various settings of the wing flaps. This is to be regretted, as it would have been of great interest to know exactly what travel of the c.p. obtains with such variable camber wings.

From the curves of characteristics it will be seen that a very considerable increase in maximum lift is obtainable by the use of hinged wing flaps, the increase amounting to 25 per cent. in the No. 4F section and as much as 29 per cent. in the case of the 2F, which is the Glenn Martin No. 2 fitted with flaps. This gain is very considerable, and appears fully to justify the use of flaps, especially as, for maximum lift, apparently no front flap is necessary. The fitting of front flaps has been found by British investigators to set up stresses of considerable magnitude, and if their use can be discarded without serious loss, the structural difficulties of flap gear are very much reduced. Incidentally these American tests appear to tally very well with the results obtained by the Fairey Aviation Co., who have for years been fitting flap gear as standard to their seaplanes. To Mr. Fairey the American results will not come as a surprise, but we imagine that in other quarters these curves will vindicate in a startling manner the use of hinged flaps for obtaining wide speed range. Early tests carried out on hinged flaps in this country indicated that a certain amount of increased lift might be obtained, but the results were less promising than are these recent American tests.

Mr. Handley Page referred, in his lecture before the Royal Aeronautical Society, to the use of flaps in conjunction with his slotted aerofoil. He had found that the lift of a slotted aerofoil could be increased by the use of hinged flaps, and it would appear that the next logical step in the development of the wide speed range wing would be the incorporation in a wing of the Martin No. 2F type of the Handley Page slots. It should then be possible to obtain some very excellent results without entailing any great mechanical difficulties. Neither the opening and closing of the slot, nor the operation of the hinged trailing edge present insuperable difficulties, and there does not therefore appear to be any reason why the combination of the two should do so. For the sake of economy in commercial flying it is to be hoped that this may be so. It is along lines like these that progress will be made during the next few years.

Air Services and Punctuality

Although generally speaking the air services between London and Paris are very well managed, there are one or two minor points which appear to call for friendly criticism. One of the main advantages of an air service—in fact one might say its *raison d'être*—is speed. Apart from those who use



IN THE DAYS AGONE : A review of the R.A.F. in Egypt by General Allenby. This event took place during the latter part of 1918. The photos. show machines lined up on the aerodrome at Abbassia. Top picture, a "vertical" from about 2,000 feet and, the lower, an oblique from 500 feet.

the air services mainly for the novelty of flying, and whose number will rapidly decrease as time goes on and the novelty becomes commonplace, passengers who travel by air do so because they wish to save time. That being so, it is distinctly annoying for a busy man who had expected to leave Croydon at 12 o'clock to be kept waiting for, as far as he can see, no apparent reason whatever. It may be that some of the other passengers have not arrived, and that the machine is detained until they turn up. When a firm is in the joy-ride business this sort of thing matters little. On a serious commercial air service it simply cannot, and should not, be tolerated. If a machine is scheduled to leave at a certain time, then it must leave at that time. If the company thereby lose a few passengers the loss will, in any case, be temporary only. Those who miss the machine will have learnt that an aeroplane does not wait for them any more than does a train or steamer. The man who gets to the aerodrome a quarter of an hour before the machine is leaving, gets through the customs, takes his seat and makes his journey to scheduled time, will retain an impression of reliability and punctuality which will encourage him to use the air service again. If he is kept waiting for close on an hour before a start is made, he will have had most of his appointments upset, will feel very far from pleased with flying as a commercial proposition, and will go by train and boat next time. Thus punctuality will pay—and pay handsomely in the long run.

There is really no reason why aeroplanes should not leave punctually at the scheduled time. The pas-

sengers are met at a certain point in town by motor-vehicles, which leave at a certain time. If the passengers are not there in time, very well, the motor must go on without them. Surely nobody expects a train or steamer to wait till it pleases the passengers to get on board. Then why should they expect an aeroplane to do so? There are various difficulties to overcome in running an air service, difficulties over which those responsible for the services have no control—such as bad weather, fog, low clouds, etc. But it is not with these things that we find fault. Where improvement is wanted is in the little things, insignificant things if you like, the scrupulous attention to details which ensures smooth running and satisfaction all around.

Aviation in Parliament

Hitherto it has been our custom to give a full report in our columns of the discussions in the House of Commons of matters relating to aviation. The restriction of editorial space now, unfortunately, forces us to abandon this feature of *FLIGHT*, and we have, reluctantly, decided that in the future, except in cases of the most exceptional interest, we cannot devote the same space to reports of this nature. In this connection, for those who wish to follow Parliamentary air discussions in detail there are available in the leading newspapers ample summaries giving all the main points, and in any case those who are sufficiently interested can obtain a copy of the "Hansard" for the modest sum of threepence.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN APRIL 24 AND APRIL 30, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
			Mails	Goods				
Croydon-Paris ...	13	68	3	9	11	h. m. 2 48	Spad F-CMAY (2h. 21m.) ...	B. (1), Br. (1), D.H.18 (1), G. (4), Sa. (1), Sp. (2), V. (1).
Paris-Croydon ...	12	60	6	10	10	2 46	Salmson F-CMAE (2h. 10m.)	B. (1), D.H.18 (1), G. (4), Sa. (1), Sp. (2), V. (1).
Cricklewood-Paris ...	3	30	3	3	3	3 11	H.P. G-EATK (3h. 0m.) ...	H.P. (3).
Paris-Cricklewood ...	3	25	1	2	3	3 12	H.P. G-EATK (3h. 5m.) ...	H.P. (2).
Croydon-Brussels ...	5	4	3	3	4	3 1	D.H.4 O-BADO (2h. 57m.) ...	Av. (2), D.H.4 (1), D.H.9 (1).
Brussels-Croydon ...	4	5	4	4	2	2 9	D.H.4 O-BADO (2h. 4m.) ...	D.H.4 (1), D.H.9 (2).
Croydon-Amsterdam ...	6	8	5	5	5	4 55	Fokker H-NABH (4h. 5m.)	F. (3).
Amsterdam-Croydon ...	6§	10	5	4	5	2 11	Fokker H-NABM (2h. 35m.)	F. (2).
Totals for week ...	52	210	30	40	43			

* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

§ One trip from Rotterdam.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. N. = Nieuport. P. = Potez.
Sa. = Salmson. Se. = S.E. 5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

The Royal Tournament Again

WITHIN a fortnight the 1921 Royal Tournament will be with us again. To be exact, it opens at Olympia on May 19 and continues until June 4. Its splendid objects need no gilding; the Tournament should have the support of every man, woman and child who can manage to get to the show.

A main feature this year will be a portrayal of the history of the Royal Marines, and should prove of surpassing interest. An incidental item in the fine programme promised is a Display by boys from the R.A.F. Cadet College, Cranwell, and an ever popular turn will be the great Tug-of-war, in which the R.A.F. will supply a team. Note the date!

TESTS MADE WITH CAPTIVE HELICOPTERS *

By Professor KARMAN

1. *Central Development of Preparatory Work.*—The tests in question were consequent upon the acceptance of a proposal for the construction of a captive helicopter, offered by 1st Lieut. Stefan von Petroczy, then Commander of Balloon Pilot Instruction, to the Imperial and Royal War Office. Lieut. von Petroczy also requested to be accredited with a certain sum for testing expenses.

The first tests were made at the Austrian Aeroplane Factory, Ltd., Wiener-Neustadt, with propellers of rather

general drafts. When the present writer was entrusted with the direction of all the tests of the captive helicopter, in the early part of 1917, the work was commenced systematically along two lines. First of all, tests were made at the propeller-testing laboratory at Fischamend; secondly, model tests were carried out in order to throw light on their stability conditions, beginning with very small models worked by rubber cords, then with a heavier 30 kg. model driven by a 5 h.p. air pressure motor specially constructed for the purpose. These tests led to the discovery of a special kind of cable, which ensures stability, and which was used in all later models.

On the basis of the above-mentioned preliminaries, tests were proceeded with along two lines: one by means of electric power, and the other with petrol rotary motor power. We shall now give a short description of these two methods, with a report of the tests carried out.

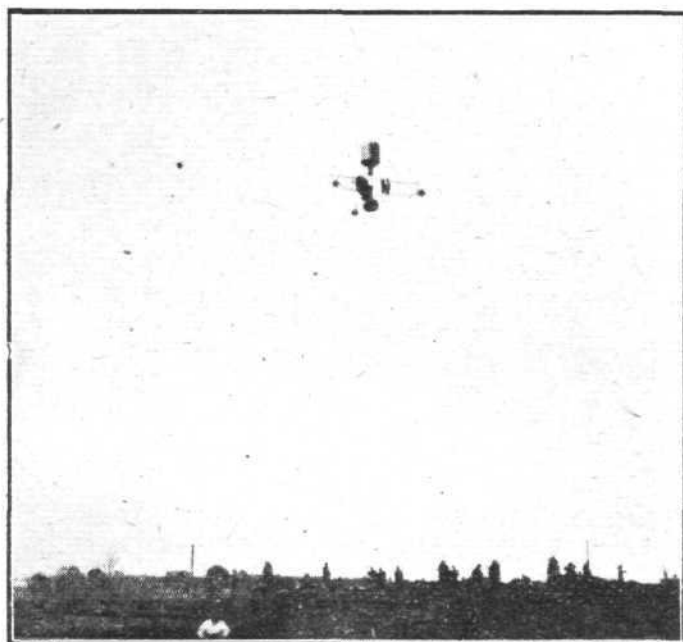
2. *Short Description of the Captive Helicopter having Electric Power.*—The machine was completely equipped with electro-motor, electric cable and winch before being tested working on the ground. The framework itself is composed of steel tubes, with an observer's car in the centre, from which there is a clear view and firing range in all directions. The lifting power is furnished by four propellers driven by a motor by means of cone gear. Its weight empty, including motor and propeller, is about 650 kg. The electro-motor weighs 195 kg.; according to the Daimler Co., its output should be 225 h.p. (originally 300 h.p. with 250 kg. load), and it has actually yielded 190 h.p., though in that case the motor was heated to such an extent, after 15 minutes' working, that the test could not be carried on. Even with this reduced power, the lifting tests resulted in a carrying capacity sufficient for three men.

In consequence of difficulty with the electro-motor, the captive helicopter has not yet been flown with electric power. The electro-motor was built into the machine, which then rose from the ground and attained a low altitude with three passengers. After a run of about 15 minutes, however, the motor caught fire, and had to be returned to the Daimler Aviation Section unaccepted, where it is now undergoing repairs.

The advisability of equipping the already completed machine with two rotary motors, which necessitate the instalment of transmission gear, was considered, but the idea was not carried out for want of suitable motors.

The machine belongs to the Austro-Hungarian Military Administration.

3. *Short Description of the Captive Helicopter having Petrol Motor Power.*—The captive helicopter with petrol motor power consists of a three-armed frame made of steel tubes, in

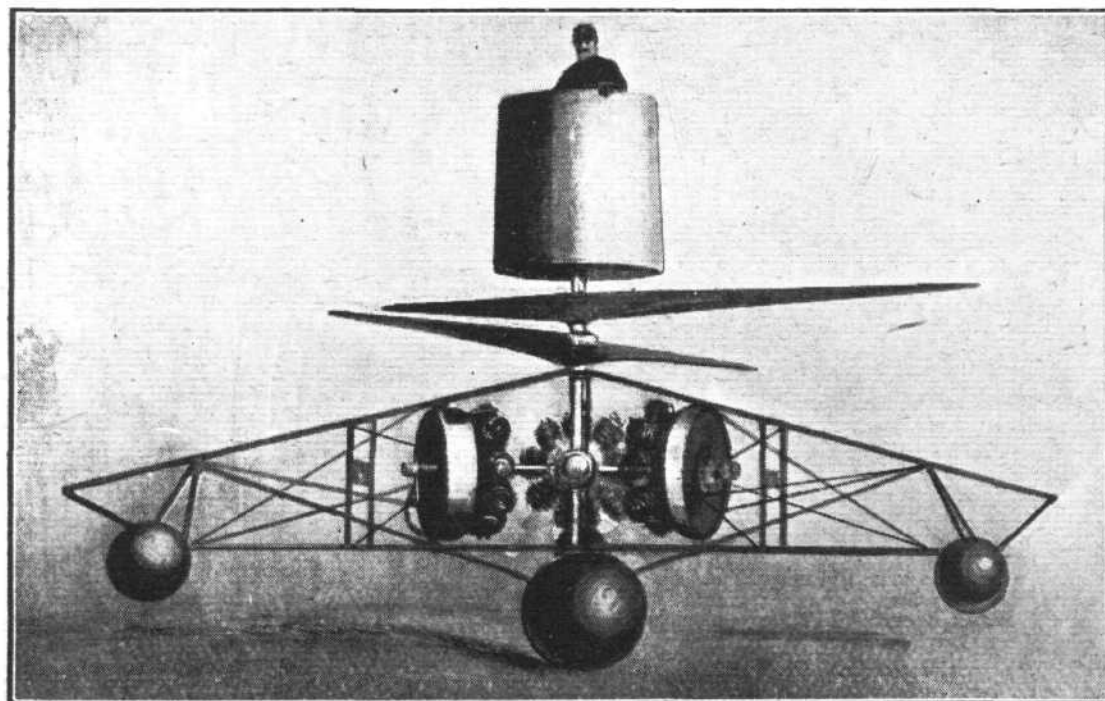


The Petroczy-Karman captive helicopter in the air.

large diameter. The Daimler works at Wiener-Neustadt also received an order from the Aviation Arsenal to hurry on the construction of a light 300 h.p. electro-motor originally intended for giant aeroplanes. As this motor was intended to weigh 250 kg. only, according to the statement of the firm, the possibility of constructing an electro-motor with power provided by means of a cable was taken into consideration.

The Austrian Aeroplane Factory proceeded no further than

* Prepared by Paris Office, American National Advisory Committee for Aeronautics.



The Petroczy-Karman Captive Helicopter: The spheres under the framework are pneumatic shock-absorbers. Each of the Le Rhone engines has its petrol tank mounted concentrically with it, so that the petrol system should be of the simplest.

which the motors M1, M2 and M3 are built. The motors (Le Rhone motors, 3h. producing 120 h.p. reconstructed for the tests) drive two propeller-shafts, revolving in opposite directions, by means of the transmission gear, and these propeller-shafts in turn drive two wooden propellers, each 6 m. in diameter, at about 600 r.p.m. Three petrol tanks are installed near the motors.

The entire system, is supported by a large pneumatic buffer, which is kept tightly filled with air through an air-pump driven by the motor; under the end of each arm three small buffers are similarly disposed. The actual object of these buffers is to reduce the shock in abrupt landings. The observer's seat, made of three-ply wood, is situated over the propeller and strongly secured to the stationary gear-case by the concave interior propeller-shaft. A machine-gun turret is located on the upper rim of the observer's seat.

A parachute is also located beside the observer. It has a capacity of 250 sq. m., and is so designed that in case of sudden stoppage of the motor it can bear the weight of the entire installation, including the observer. The parachute may be worked in the two following ways:—

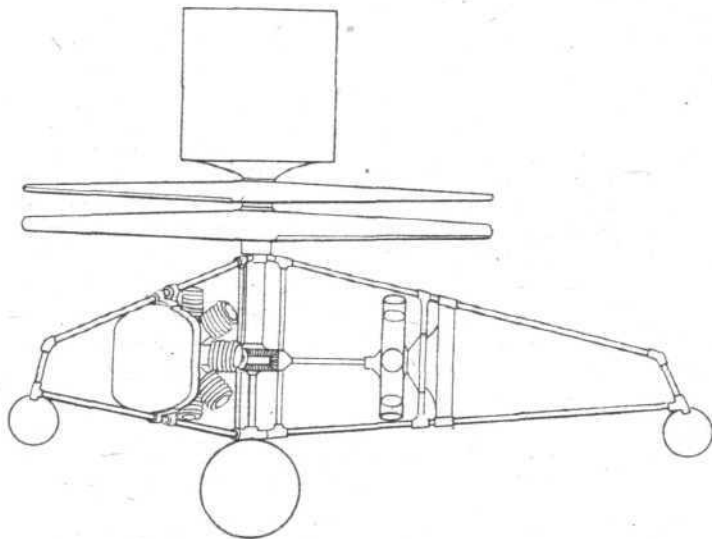
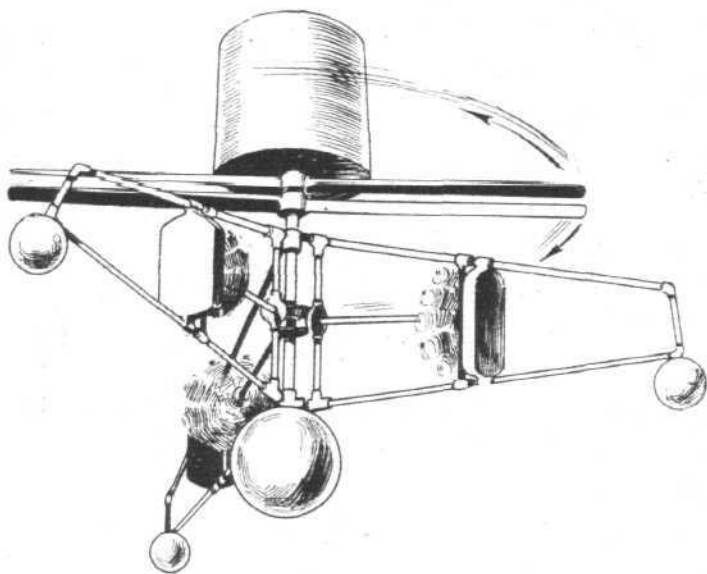
1. Automatically, in such wise that when a regulator, adjusted for the purpose, falls below a certain number of revolutions of the propeller, it releases a mechanism which ejects the parachute. This ejection from the centre causes the parachute to open instantly, and tests have proved that it begins to work after a drop of about 25 m. This device thus insures the captive helicopter against damage, in case

fuel for one hour, but not including the observer and the machine-gun, is about 1,300 kg. It is strongly constructed, and some slight lessening of weight may yet be attained. At starting, about 1,800 kg. were measured, that is, about 5 kg. per h.p. This figure can be considerably augmented by enlarging the propellers.

The original type of captive helicopter with petrol motor power was manufactured by the firm of Dr. Liptak, Ltd., Budapest-Szentlőrincz, under the special supervision of my collaborator, Lieut. Eng. W. Zurovec, and the above-named firm owns our patent. It may here be mentioned that 1st Lieut. von Petroczy was most energetic in promoting the work above described.

4. *Test Flights with Petrol Machine.*—The reports of the test-flights undertaken may be summed up as follows:—From April 2 to 5, lift and stability tests at low heights, duration tests up to 60 minutes. From May 17 to June 10, climbing to 10 m.-50 m. altitude. Results: Lift excess on the ground to a load of 4 men. Perfectly tranquil soaring at an altitude of 50 m. Wind velocity during tests up to 8 m.p.sec.

After about 15 successful flight tests, the machine had a breakdown when landing on June 10. The power of the enemy motors, which had been recently repaired, diminished so considerably that there was an insufficient excess of thrust, and the machine therefore oscillated violently, especially while being brought down. The crew abandoned it, and the machine turned over on the ground, the propeller-blades



THE PETROCY-KARMAN HELICOPTER : Side elevation and perspective view of the machine as it appears from below.

the motor should stop at low altitudes. The same mechanism brings the motor to a standstill at the time of ejecting the parachute.

2. The parachute may be worked by hand, by the observer, who is also provided with a bag parachute for personal safety.

We may here observe that there is need for the use of the parachute only when at least two motors have stopped, two motors being capable of maintaining the propellers at a sufficiently high rate of revolution.

The climb takes place as follows: When the observer has taken up his position, the motors are started, and this creates no difficulty by reason of the fact that one motor at work causes the others to revolve. The functioning of the motors can be controlled by the observer, and future types of the captive helicopter will have the necessary instruments located within reach of the observer. As soon as the motors have attained the full number of revolutions, a signal will be given for the loosening of the winch, and the machine will then, according to present experience, climb at a speed of about 1.2 m. per sec. This climbing speed mainly depends upon the pitch of the propeller and the direction of the wind, and it can therefore be considerably increased. The captive helicopter is brought down by reversing the winch. Up to date, the motors have always been run at full power, in which case the excess of lift must be compensated. In future, the motors will be throttled in order to diminish the work of the winch.

The total weight of the captive helicopter, with engine and

sticking into the earth. Considering the state of the motors, my collaborator, Lieut. Zurovec and I wished to omit the tests (there being a wind velocity of 8 m.p.sec.), but were urged to carry them on by the Commission surveying the tests.

The results fully confirmed those already arrived at with model tests, so far as stability is concerned. Observations made in the wind proved that, in addition to the fundamental demand for ample excess of thrust, the position of the centre of gravity of the machine in its relation to the plane of rotation of the propeller is of great importance. The results obtained in that respect, both in theory and by means of practical tests, should be of the utmost value as applied to the construction of a second type.

Application of the Captive Helicopter

(a) *Captive Helicopter with Crew, for Observation Purposes During War on Land.*—The advantages of the captive helicopter as compared to captive balloons are as follows:—They are but slightly visible, and therefore provide limited target area for artillery; they are mounted with guns and are specially adapted for shooting upward during attacks by aeroplanes; they are non-inflammable, they can be started without any loss of time and can be rapidly transferred from one place to another. The comparison may be continued by stating that:—A balloon-section on the south-west front, with one balloon, requires:—1 automobile winch-wagon, 2 automobile gas-wagons, 3 freight wagons, 6 officers and 137 men, whereas a captive helicopter requires:—1 auto-

mobile with three trailers, 1 freight automobile, 6 officers and 20 men.

(b) *Captive Helicopters for Observation from Battleships.*—Adapted in a suitable manner, the captive helicopter might prove to be the best possible means of taking long-distance observations from battleships.

(c) *Captive Helicopters for the Protection of Open Towns and Coasts from Aeroplane Raids.*—A series of captive helicopters would not only be able to give warning of the approach of enemy aircraft, from a long distance, but might also be able to open effective defensive firing, if properly armed.

(d) *Captive Helicopters without Crew for Radio Purposes.*—Tests hitherto carried out with kite-balloons or antenna have always been unsuccessful either on account of a breakdown of the kite-apparatus at a low wind velocity, or because of disturbing motion of the balloon antenna during squalls. These difficulties would be avoided by the use of captive helicopters, and are therefore of particular utility for colonies and districts where stable mast-construction cannot easily be carried out, and which may also give rise to great outlay.

(e) *Captive Helicopters for Meteorological Work.*—By means of the captive helicopter, registering devices can easily be taken up and measurements carried out rapidly in all weathers.



LONDON TERMINAL AERODROME, CROYDON

Monday Evening, May 2.

THE passenger traffic on the "airways" is now growing rapidly. Nearly forty applications for seats have had to be refused during the past week, and the sooner the absurd arrangement of the subsidy that prevents the British companies from running more than one machine three times a week is altered the better. They have ample fleets to run a daily service, and thus carry twice the number of passengers.

The Instone Air Line have, despite the bad weather, completed all their scheduled flights. The B.A.T. flew over to Northolt on Saturday with a spare pilot, who brought back the Instone Line's D.H. 4a, which has been overhauled there. The D.H. 18 G-EARO is dismantled for painting and overhaul. The Air Ministry have now insisted that the portion of the leading edge of the wing that comes into the slip-stream of the 450 h.p. Napier engine should be covered with either three-ply or aluminium. Considering the amount of service these machines have seen without this modification, it appears rather unnecessary.

Mr. Hearle, of the De Havilland Aircraft Co., visited the aerodrome on Friday, and witnessed the departure of the D.H. 18 G-EAUF.

Another Bristol "Tourer," ordered by Senor Bayor of Madrid, left for Paris piloted by Mr. Uwins. At Paris Major De Havilland will take it over and fly it to Madrid.

Mr. Basil S. Foster, who runs the passenger car service to and from the aerodrome, and provides amongst other things a garage and a Bureau de Change on the aerodrome, has enlarged his office and waiting-room. Mr. Shaw is now in charge of Mr. Foster's activities on the aerodrome, and on busy days is ably assisted by a troop of boy scouts.

The Aircraft Disposal Company is busy on an order for about forty D.H. 9's for the Dutch Government for use in Java, and on Friday several of these were lined up for inspection by a Dutch committee. The Disposal Company is still delivering "Avros" to the Belgian Army.

The Shell-Mex petrol company have now pegged out a site on which to sink a tank for bulk petrol storage. This is just by the public enclosure, and will be arranged so that machinists can be filled up with petrol as they are lined up ready to leave for the Continent. This arrangement is long overdue, and will mean a great saving of time and money.

Friday was again a day of great events. In the afternoon Capt. Muir took the aerodrome's most regular "joy-rider" for a trip to Brighton. At 3 o'clock Messrs. Cockerell and Broome left Croydon in the Vickers "Viking" and landed on the Thames between the Lambeth and Westminster bridges.



NOTICES TO AIRMEN

List of Notices Operative and Cancelled

THE undermentioned notices, which were in most cases of a temporary character, are no longer operative. The "List of Notices operative and cancelled" issued on April 1, 1921, should be amended as follows:—

Year 1920

To be deleted from para. 1 and added to para. 2:—
Nos. 38, 72, 84, 101, 108, 113, 115, 131, 134 and 141.

Croydon Aerodrome: Telephone Number

It is hereby notified:—The telephone number of the London Terminal Aerodrome, Croydon, is Purley 1180, and not as published on page 222 of the April Edition of the London Telephone Directory. Arrangements have been made for the Purley Telephone Exchange to transfer calls to the above-mentioned number.

(No. 38 of 1921.)

Here Gen. Sykes and Col. Beatty were picked up, and flown in the "amphibian" to Paris. The "Viking" returned to Croydon on Saturday afternoon. Whilst in Paris exhaustive tests were made in alighting on, and getting off, the Seine. Numerous French officials were carried during the tests, and were, I understand, much impressed. This experiment brings a step nearer the idea of a service of "air expresses" from the Thames in London to the Seine in Paris.

The "R. 33" flew down from Pulham on Friday night in order to carry out further tests on the night-lighting arrangements. All the aerodrome lighting was in working order—the illuminated landing "L," the "cone" light with its vertical searchlight, the ordinary searchlights and, of course, the lighthouse. The tests gave good results, the lighthouse being visible 30 miles away, the "cone" light 25 miles, and the searchlights at 20 miles. A miniature "Brock's benefit," in the form of rockets and bursting star shells, helped to enliven the proceedings. After leaving Croydon, the airship went along the "airway" to Lympne and across the Channel. I understand that the real reason for the Channel trip was to examine the marine lights with a view to their use both as marine and aircraft lights. The light from the Varne lightship was subjected to exhaustive tests, as this important light is about half-way across the Channel.

The K.L.M. have issued information as to the loading of their monoplanes. This is an interesting example of the loading of civilian machines. It runs as follows:—

Petrol (300 litres), 495 lbs.; pilot (with personal baggage), 187 lbs.; water, 88; oil (44 litres), 88; Verey pistol and 18 Verey lights, 11; log book and maps, 3½; three pickets for picketing, 13; cord, 6½; "First Aid" box, 3½; tool box and spare parts, 11; four passengers and luggage, 792. Total, 1,698 lbs.

The pilots of the K.L.M. are an amusing crowd. Mr. Duke has apparently a weakness for monkey-nuts, and also is by way of being a composer, while Mr. Holmes has for a boon companion a woolly dog, which he affectionately calls "Pip."

The joy-ride firms had a good time over the week-end, and were out in force—the Leatherhead Aviation Company with a D.H. 6 and an Avro, and the Surrey Flying Services with two Avros. The enclosure has been enlarged to about four times its original size, and both on Saturday and Sunday presented an animated appearance.

On Monday the Messageries Aériennes commenced new services between Paris and Croydon. In future machines will leave Paris at 9.30 a.m., 12.45 p.m., and 4 p.m., while the return services from Croydon will be at 10 a.m. and 4 p.m.

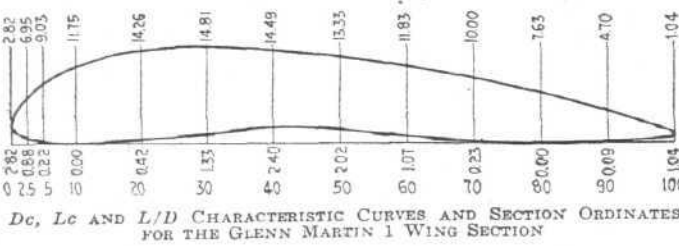
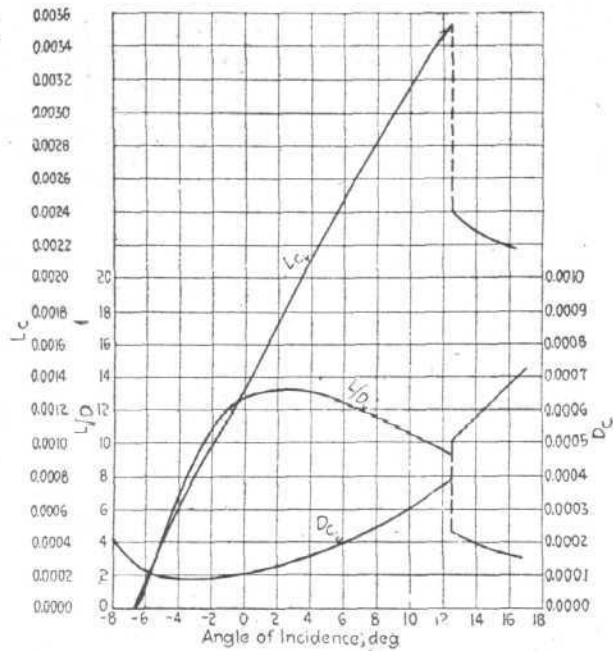


Alighting Tests on the Seine

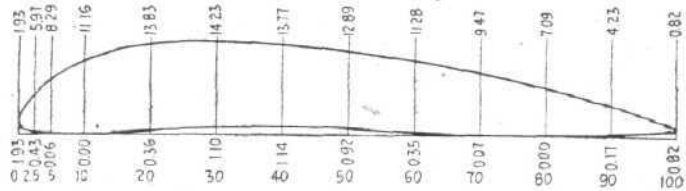
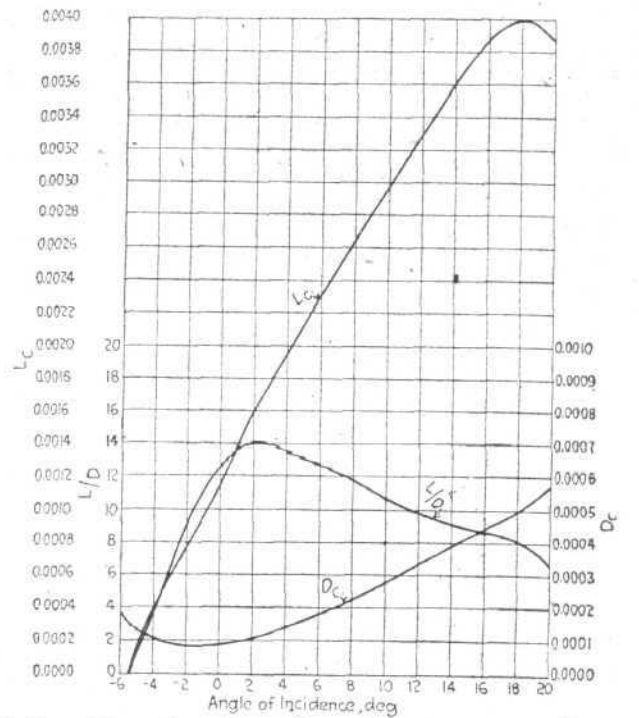
FOLLOWING on the Air Ministry tests made by Messrs. Vickers, Ltd., with their amphibian "Viking III" of alighting on and starting from the Thames, it is announced from Paris, that the French Under-Secretary of State for Air is engaged on plans for carrying out similar tests on the Seine. If a suitable place can be found, which should not be difficult, it would bring a good deal nearer the day when a passenger could step on board a seaplane (or amphibian) at Westminster and leave it again in the centre of Paris, avoiding the tedious journey between London and Croydon and le Bourget and Paris.

A Paris-Amsterdam Air Service

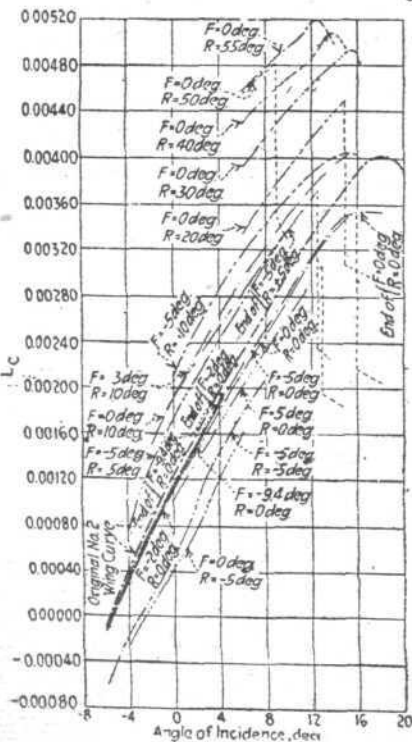
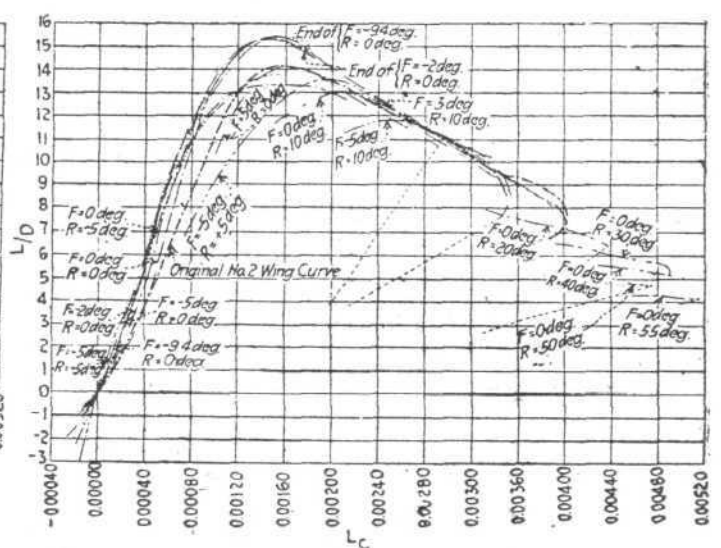
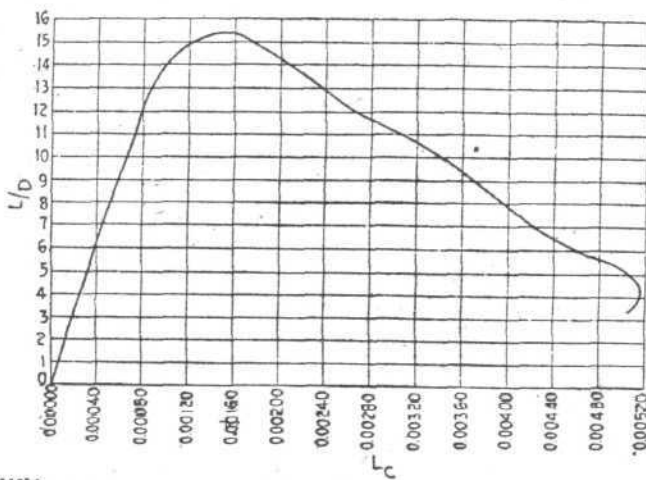
GRADUALLY France is extending her air lines while we at home seem to rest content with our one London-Paris line. On May 2, two machines left the Paris air port at le Bourget for Schiphol Aerodrome, Amsterdam. These two machines inaugurated the new service by carrying two passengers each, and it is hoped to maintain a regular service between the two cities.



D_c , L_c and L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE GLENN MARTIN 1 WING SECTION



D_c , L_c and L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE GLENN MARTIN 2 WING SECTION



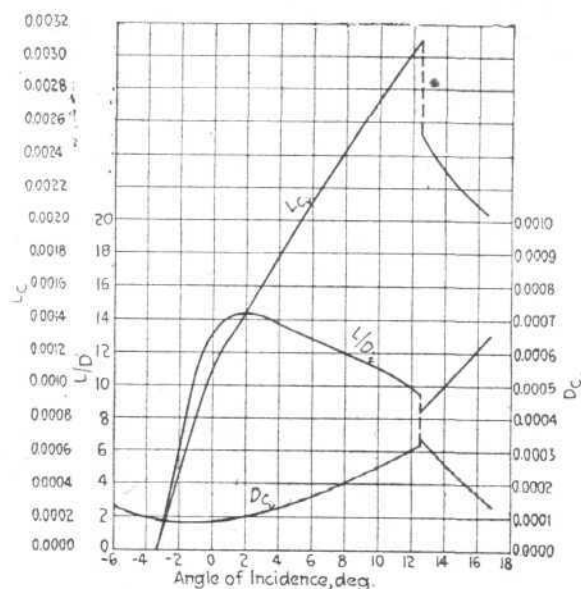
COMBINED CHARACTERISTIC CURVES OF THE GLENN MARTIN 2F WING SECTION

SOME EXPERIMENTS ON THICK WINGS WITH FLAPS*

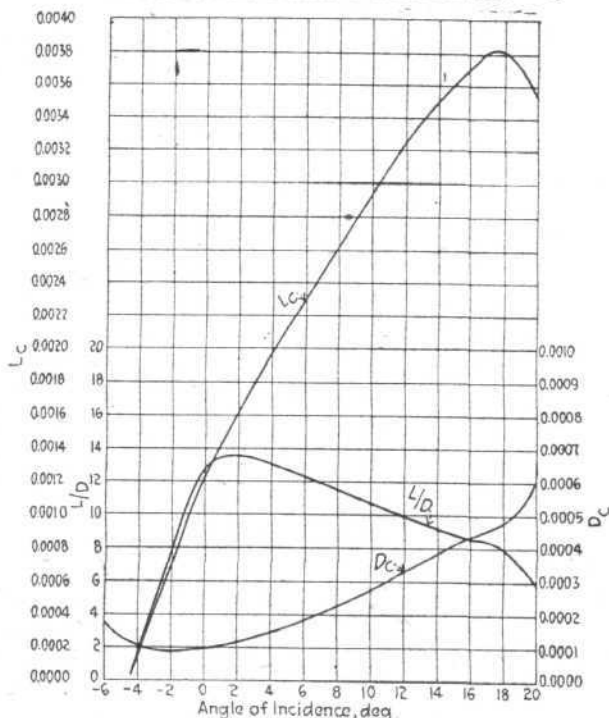
By C. D. HANSCOM, Chief Engineer of the Glenn L. Martin Co.

THE subject of thick wings has been taking on a constantly increasing importance in aeronautical discussions for several years. Since the War, with the urgent necessity for instant production removed, aeronautical engineers have been turning to practical experiments. It should, therefore, aid in general aeronautic development if all information on

* Paper read before the Society of Automotive Engineers.



D_c , L_c and L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE GLENN MARTIN 3 WING SECTION



D_c , L_c and L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE GLENN MARTIN 4 WING SECTION

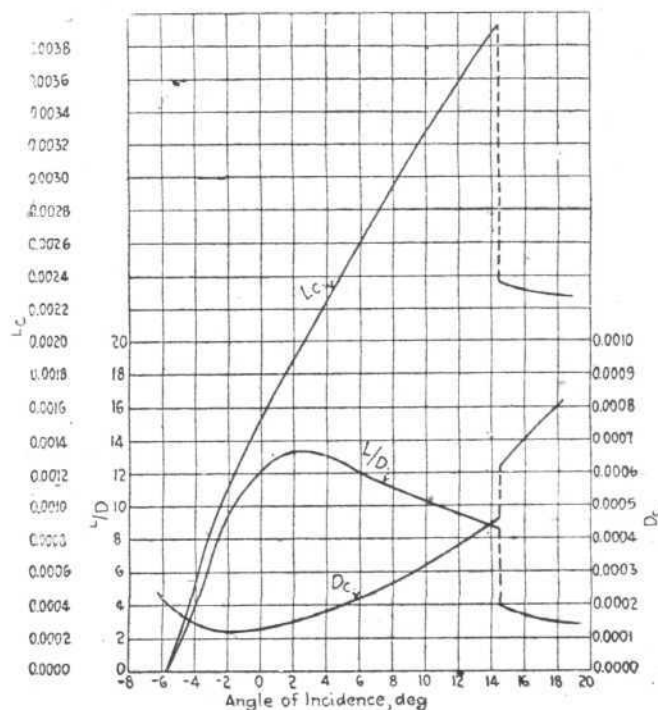
the subject is made available for common use. The Glenn L. Martin Company has recently had tests made in the wind tunnel of the Massachusetts Institute of Technology in the endeavour to obtain more data on the action of wings with flaps. Both front and rear flaps were employed, and the results showed several interesting features. When it was decided to have the experiments made, no sections were at hand which possessed all of the qualifications needed. It was especially desirable that the movement of the flaps should produce minimum discontinuities of surface. This requirement at once limited the choice of sections. Ultimately four base sections were adopted and the new wings developed from them.

Four Master Sections

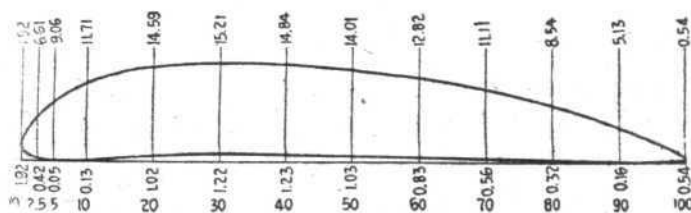
The first, and most logical, choice was the U.S.A. 27. The wing developed from this section eventually proved the best of those tried. The second base section was a wing of my own, the H.1, the data for which has never heretofore been published. A third base section, which is now being shown for the first time, by permission of its designer, G. M. Denlinger, was the D.1. The fourth master section was a composite curve which resembled no wing in particular.

From these master curves, six new wings were designed. The U.S.A. 27 was thickened appreciably, and minor modifications were made in its form. The new section was called the No. 2. The D.1 was uniformly increased in camber, by a percentage ratio, producing the Glenn Martin No. 5. The H.1 was modified in three ways. The rear upper surface was raised in all cases to allow more room for the flap. This injured the qualities of the wing to a considerable degree. One wing, designated as No. 1, was then made having a sharp trailing edge; another, No. 6, with a blunt trailing edge; and a third, No. 4, with a blunt trailing edge and a practically flat under camber. The fourth master section was modified only slightly, having been designed especially for the purpose. This latter was called No. 3.

The six models and the sockets were made at the Massachusetts Institute of Technology by its employes. The ordinates given in the different illustrations were scaled

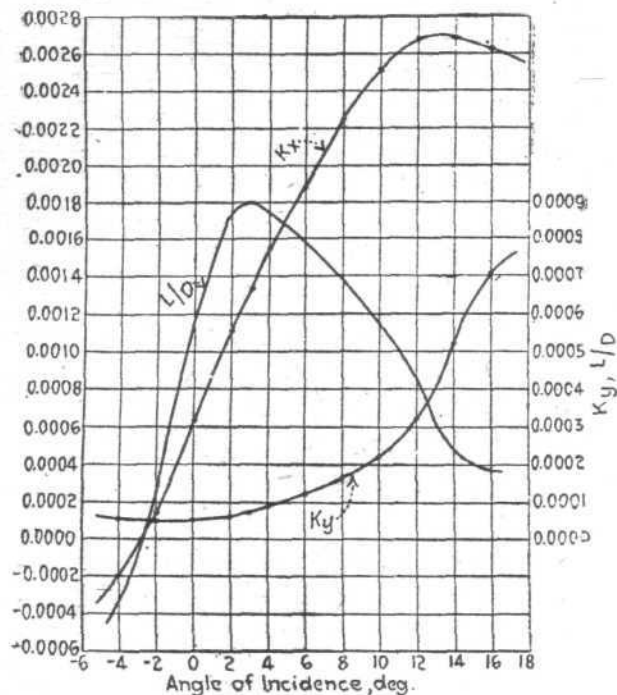


D_c , L_c and L/D CHARACTERISTIC CURVES FOR THE GLENN MARTIN 5 WING SECTION

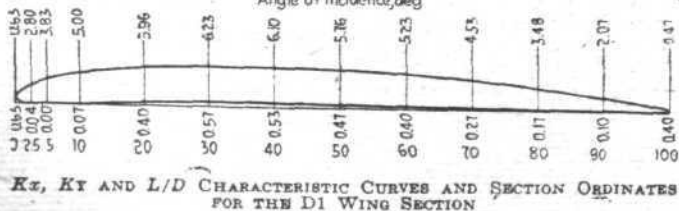
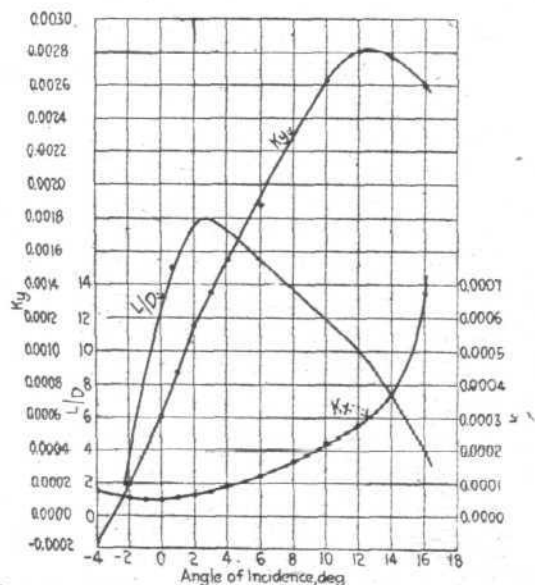


SECTION ORDINATES FOR THE GLENN MARTIN 5 WING SECTION

from sections of these models, and therefore represent to a good degree of accuracy the actual sections tested. The models were all 3×18 ins., and the wind velocity was always 30 m.p.h. The tests themselves were under the personal direction of Prof. E. P. Warner. I was also present, and at the balance in most cases.

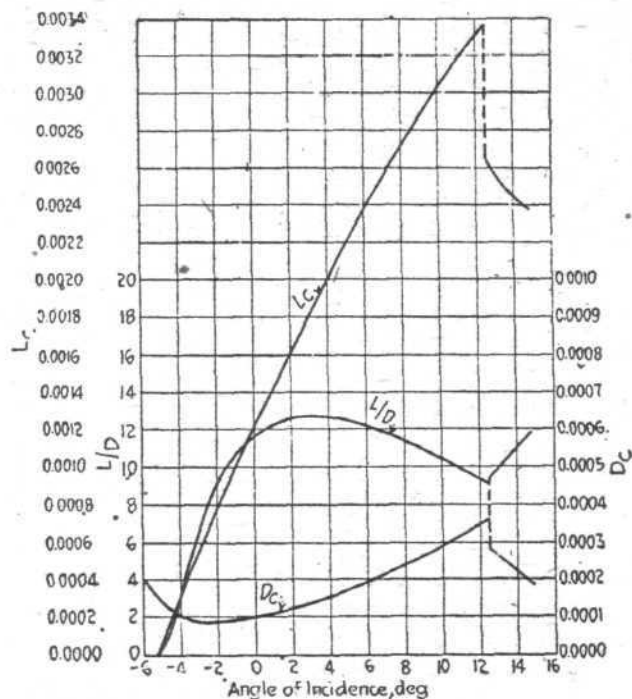


The special qualities which led to the selection of the four master sections deserve attention. The U.S.A. 27 was not thick enough, nor did it have a sufficiently high lift for the purpose for which it was needed. It was, however, by far the best section known. It was, therefore, only logical that it should be chosen. The form of the Glenn Martin No. 3 was arbitrarily adopted, the purpose being to combine low drag at small angles with good lift at higher angles. The L/D was better than for any of the other sections, but the lift proved unsatisfactory. The choice of the D.I and H.I wings was the result of private tests made in 1919. The D.I was designed as a high-speed section. It actually proved to be one of the best-known wings, of practical shape, at a lift coefficient of from 40 to 50 per cent. of the maximum. In this range, and in fact everywhere above it, the D.I is much superior to the R.A.F. 15. Below 36 per cent. at high speeds, it is inferior, although not greatly so. No change was made in the section in stepping all ordinates up by the

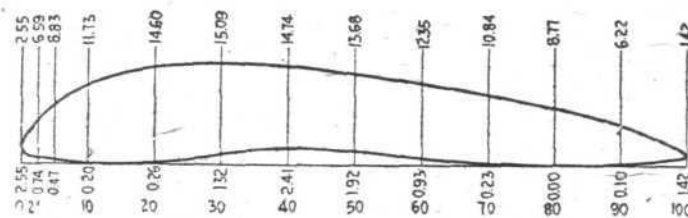


Kx, Ky AND L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE D1 WING SECTION

same ratio to obtain the Glenn Martin No. 5. The H.I was designed to attain good efficiency at large angles and, if possible, a high lift. The high lift did not materialise, but the L/D at climbing speeds varying from 66.6 to 75 per cent.



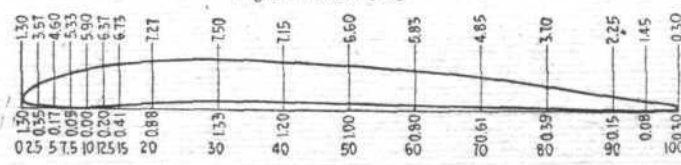
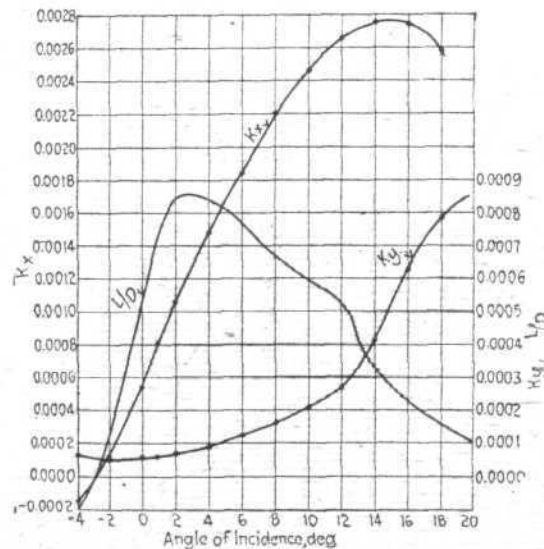
Dc, Lc AND L/D CHARACTERISTIC CURVES FOR THE GLENN MARTIN 6 WING SECTION



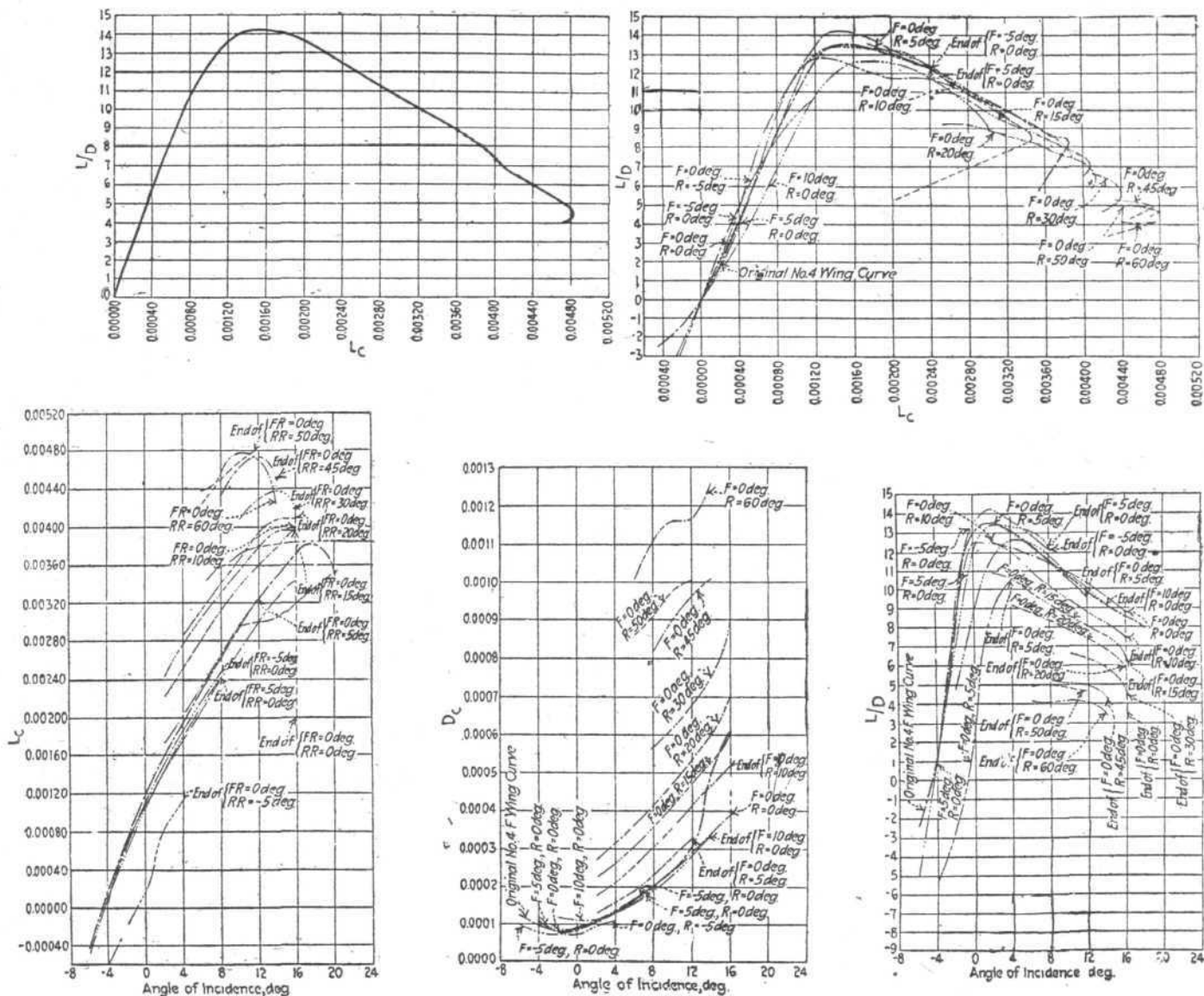
SECTION ORDINATES FOR THE GLENN MARTIN 6 WING SECTION

of the maximum Lc is exceptionally good, being 16 to 15.* Two attempts were made to improve the lifting qualities of this section, by thickening the nose, but they failed to accomplish their object. The wings thus produced, H.3a and H.3b,

* Two sets of characteristic curves are shown for the H.I. Those having the maximum L/D of 17.9 are the standard Massachusetts Institute of Technology tests. The others, with a maximum L/D of 18.9, show the same data corrected for spindle interference to permit of a direct comparison with the tests performed at the National Physical Laboratory, Teddington, England.



Kx, Ky AND L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE H3a WING SECTION



COMBINED CHARACTERISTIC CURVES OF THE GLENN MARTIN 4F WING SECTION

are practically the same, except that H.3a has a very slight bump on the lower surface at 50 per cent. of the chord. The difference in the characteristic curves is, therefore, noteworthy. H.3a and H.3b, however, merely indicated the advisability of making the modifications in H.1 as small as possible.

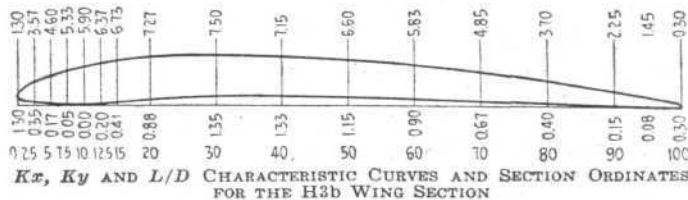
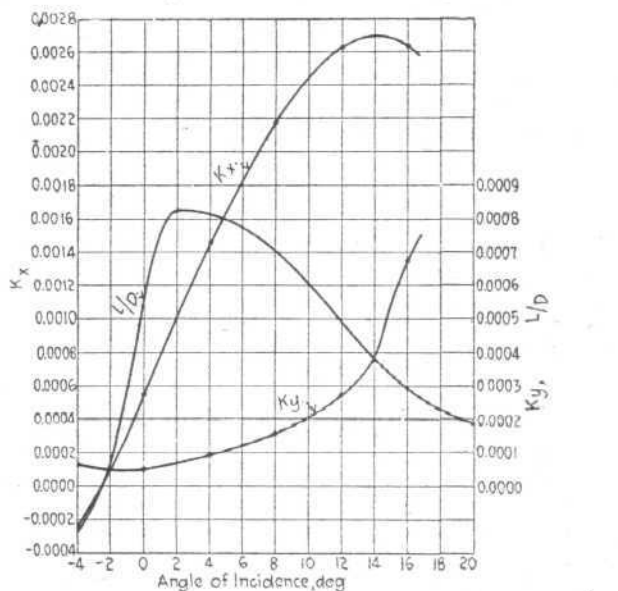
Unfortunately, H.1 had to be changed to a considerable degree to permit flaps to be employed. The rear lower surface had to be bulged down to accommodate the hinges and operating mechanism, and to relieve the sharpness of the break which would occur when the rear flap was pulled down. These changes proved one point in the original design. Efficiency at high angles was obtained in the H.1 by making the angles of trail, approximate angles made by the upper and lower rear surfaces to the chord, as nearly the same as possible. In other words, the trailing part was thin. The new Glenn Martin wings based on the H.1 apparently lacked any exceptional efficiency at large angles because of the thickening of the trailing part out of proportion to the rest.

New Wing Designs

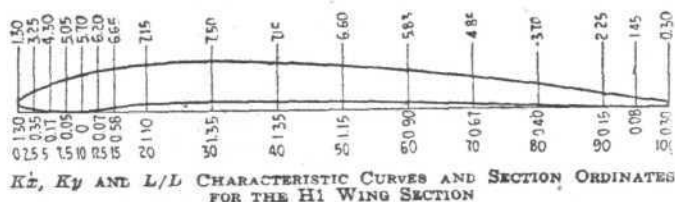
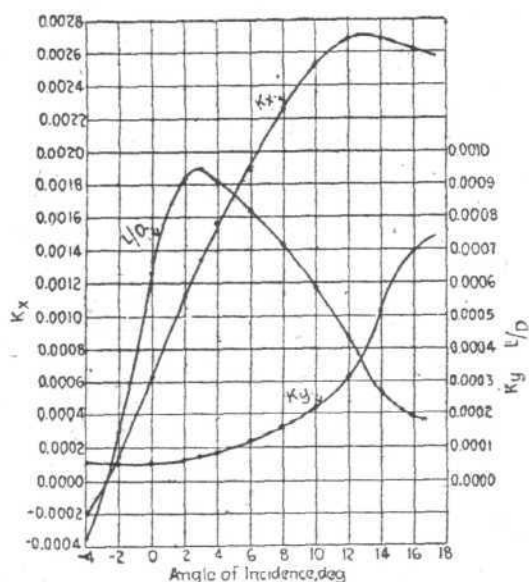
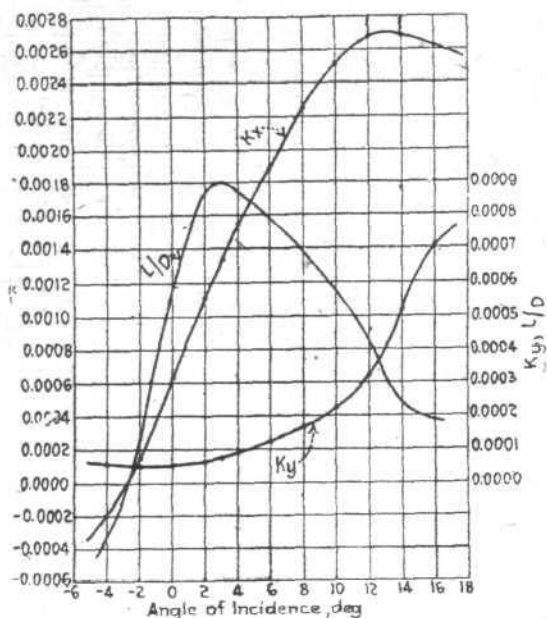
The six new wings are sufficiently described by the characteristic curves and tables of data. It may be noted that discontinuities occur in several cases at the burble point. This phenomenon is not unusual for thick wings, and, of course, disappears at higher velocities. It is obvious that the Glenn Martin No. 2 and the Glenn Martin No. 4 are the best of the six. The Glenn Martin No. 5 would undoubtedly have shown a higher lift in proportion as the velocity increased, but its lower efficiency ruled it out.

Sections Nos. 2 and 4 were, therefore, tested being hinged at 15 and 70 per cent. of the chord length. The hinges were approximately 0.03 in. from the bottom surface, and the hinge-plates were sunk flush with the surface. The slight hollows at the hinge-plates and the cracks between the flaps and the main part of the wing were filled with plasticine. The sections were retested, and the errors of alignment noted. It is, of course, impossible to cut a wing in this

manner and duplicate the original results, unless the model is metal. The errors, as indicated by a study of the model and the curves obtained, seemed due chiefly to lack of perfect alignment of the flaps. After a standard position for the



Kx, Ky and L/D CHARACTERISTIC CURVES AND SECTION ORDINATES FOR THE H3b WING SECTION



Honours

WAZIRISTAN AIR AWARDS.—The King has approved of the following rewards for gallantry and distinguished service in Waziristan, 1919-20:—

Bar to the D.F.C.—Flying Officer J. R. Swanston, D.F.C., R.A.F. (since killed).

D.F.C.—Observer Officer (Hon. Flight Lieut.) D. Craik, R.A.F.; Pilot Officer N. Fielden, R.A.F.; Observer Officer B. A. Foord, M.C., R.A.F.; Flying Officer H. C. Hawkins, R.A.F.

M.B.E. (Military Division).—Pilot Officer B. W. Wright, R.A.F.

Examinations for Aviation Ground Engineers

CANDIDATES desirous of becoming certified Ground Engineers (Aircraft or Engines) under Section 4 of the Air Navigation Directions, 1919, may, until further notice, be examined at the Air Ministry (Alexandra House), Kingsway, London, W.C. 2, on alternate Wednesdays, commencing as from May 4, 1921, and monthly at Birmingham, Leeds or Bristol as required.

Candidates desiring to be examined can secure application forms from the Secretary (C.A.L.), Air Ministry, London, W.C. 2, and should submit their completed forms of applica-

tion, accompanied by a fee of 5s., at least seven days prior to the date on which the examination is desired. Candidates should also state at which of the above places they wish to be examined.

"R. 33's" Night Flight
LAST week the experiments with night-flying lights on the Croydon-Paris air route were continued, the airship "R. 33" leaving her mooring mast at Pulham at 9.19 p.m. on April 29, arriving over Waddon aerodrome at 10.30 p.m. Cruising slowly over and around the aerodrome the airship conducted a number of experiments with the different lights at Waddon, afterwards continuing her cruise to Lympne and the coast in order to test the efficacy of the lights on the route.

Crossing the Peruvian Andes
THE Peruvian Andes were crossed by aeroplane for the first time on May 2, when Giovanni Ancillatto, an Italian aviator, left Lima at 10.45 and reached Cerro de Pasco at noon, crossing the Andes at an elevation of 16,000 ft. in an Ansaldo machine equipped with a 300 h.p. Fiat engine. Ancillatto made a previous attempt the day before, but, after reaching the high plateau region, was turned back by fog.

flaps had been determined, the other tests were run at accurate angles with respect to this standard; but the standard varied slightly from the original wing. Since the envelope curve is the ultimate goal, this minor error, while annoying, is relatively unimportant.

The Glenn Martin No. 4F, which was the No. 4 section with flaps added, was run first. The test demonstrated clearly that at very low angles of lift coefficient a negative angle is best for both front and rear flaps; but that at any speed ordinarily reached, the front flap only should be raised from the normal position. At high values of lift the front flap could profitably be in its normal position, and the rear flap should be down about 45° to 50°. It is only at the burble point and beyond that there is any noteworthy gain from the lowering of the rear flap.

The Glenn Martin No. 2F gave better results than the No. 4F, as expected. The conclusions drawn in regard to the use of flaps are almost identical. An angle of -5° for the front flap is beneficial at all values of lift up to the burble point of the original wing. At very small lifts, the front flap can be raised even to -10° with additional gain. In this latter region, also, the rear flap should be lifted to -5°. As the burble point is reached, the front flap apparently should come to 0°, and from there on the rear flap should be brought down by successive stages to about +55°.

The qualities of the wings with flaps, as indicated by these tests, remain to be considered. The maximum lift increased 25 per cent. for the No. 4F and 29 per cent. for the 2F, over the original wing. These new maxima, 0.00484 and 0.00516, constitute the highest lift coefficients yet attained as far as I am aware.† The drag at this extreme lift is, however, very high. It is interesting to note that for the No. 2F the L/D is 15.1 at 25 per cent. of Lc maxima, and 8.4 at 11 per cent.‡ These values of Lc correspond to speeds of twice and three times the minimum respectively. It would, therefore, appear that for racing machines the use of a wing with flaps is highly desirable. For heavy weight-carrying planes, the drag would be high at low speeds; and the performance would resemble that of the Fokker-Junkers, which seems to be slow in pulling up from the ground, but climbs well when a good flying speed is attained.

The effect of an increase in speed and scale is uncertain, since experiments on thick wings with flaps have not been made. There is, however, no reason to believe that the wing characteristics would not improve to an appreciable extent. In any event, full-flight tests can soon settle the question.

* If a correction is applied for the reduction of chord and area with the flaps at large angles, Lc would approach 0.00575 in the case of the No. 2F.

† The largest value I have noted elsewhere is that recorded for the R.A.F.19 in Report and Memorandum No. 648, published by the Advisory Committee for Aeronautics (Great Britain). That report records $C_l = 0.93$, or $L_c = 0.00474$. The Handley Page apparently only reached $C_l = 0.8$, or $L_c = 0.00408$. [This paper was read before Mr. Hanscom had seen the diagrams from Mr. Handley Page's lecture, hence he was judging the H.P. slotted wing on the figures relating to the R.A.F. 6 tested with and without slot at the N.P.L. Since then, however, other sections and better shaped slots have given better results, while a section fitted with six slots showed as high a maximum lift coefficient as 1.96 (absolute). This lift, however, occurred at an angle of incidence of about 45 degrees and, in practice, it would be almost impossible to make use of it, owing to the large angle.—Ed. FLIGHT.]

‡ The corresponding values for the R.A.F.15 obtained from National Physical Laboratory tests are 14.5 and 7.7 per cent.

THE AMERICAN JUNKERS S. L-6 COMMERCIAL MONOPLANE

Some Official Performance Tests

[In view of the attention which is now being paid by designers all over the world to the cantilever type of monoplane, the following American official report on some performance tests made with the American Junkers (Larsen) monoplane may not be without interest, and they appear to indicate that the low position of the wings is not conducive to nice handling, according to reports by the test pilots. The performance is good for the power loading showing that the thick tapered cantilever wing is not necessarily inefficient.—Ed.]

Official Performance Test—Summary of Results

Aeroplane, Junkers S. L-6; No. P-145.

Type, Commercial.

Engine, 185 h.p. B.M.W. engine; 243 h.p. at 1,445 r.p.m.

Propeller, German make.

Equipped as passenger machine.

Weight (lbs.):—

Empty (including water)	2,317
Crew	655
Fuel (benzole 50 per cent.; petrol 50 per cent.)	569
Oil	64

Weight loaded 3,605

Weight/square foot, 8.64 lbs.

Weight/horse power, 14.8 lbs.

This engine develops 243 h.p. at 1,445 r.p.m. run on a mixture of half benzole and half petrol.

Standard altitude in feet.	Time in min.	Climb.		Speed.	
		R.p.m.	Rate ft. min.	M.p.h.	R.p.m.
0	0	1,365	580	111.2	1,445
6,500	14.4	1,365	345	107.2	1,435
10,000	27.3	1,365	215	102.5	1,420
13,200*	48.7	1,360	100	95.1	1,395
15,900†	—	1,350	0	67	1,350

* Service ceiling.

† Absolute ceiling.

Endurance, full throttle at 10,000 ft. (incl. climb), 7 hours 35 minutes.

Minimum speed at sea level (lowest throttle), 52.1 m.p.h.

Pilots' Observations

The flying qualities of the JL-6 all metal monoplane appear new and different when originally flown by pilots familiar with conventional types, but the same general flying principles applying to all aeroplanes govern the flying of the Junker. An exact co-ordination and proportioning of the amount of the controls is required or the aeroplane will side-slip or skid badly. It is extremely sensitive in this respect. The rudder and elevators appear and feel too small.

The aeroplane is spirally unstable due to the large fin area toward the tail causing a lifting of the rear of the fuselage in the event of a side-slip.

Until familiar with the aeroplane, pilots invariably use too little bottom rudder in making turns. When stalled, both with power and without, the tendency to spin is easily checked, the aeroplane responding readily to the controls.

The JL-6 takes off very slowly, especially when heavily loaded. The tail does not come up until some distance has been travelled. The visibility for the pilot is not good. One side is almost entirely blind, and it is difficult to see over the

end of the nose. The fact of flying from one side with the other partially blind has a tendency to cause the pilot to fly with one wing low; a very bad feature in landing. The aeroplane has an exceedingly long and flat glide. The absence of wires gives the erroneous impression of slow speed in the glide.

The pilot must be careful in landing. The JL-6 will suddenly drop a wing when flying speed is lost unless care is used to keep the wings parallel to the ground in the glide. A stall landing is hazardous. The aeroplane has a tendency to ground loop in landing or in taxiing in a strong wind. It rolls but a short distance after landing. The landing gear effectively cushions the landing shock.

The position of the controls is unhandy, especially for a pilot of medium stature. The distance from the seat to the pedals is too great to permit of their use in a natural position. Operation of these pedals having one end hinged to floor cramps the ankles and leg muscles. The long reach to the throttle and switch does not permit quick action in emergency. The notched push-rod type of throttle makes delicate use difficult. A standard engine throttle is desirable.

A mixture of one-half petrol and one-half benzole gives the best engine results.

The radiation surface is ample, even in warm weather. The shutter control is quite inadequate. The oiling system caused no trouble.

The maintenance of this aeroplane is, on the whole, very simple, especially in regard to the engine. The mounting gives easy access to spark plugs, distributors, carburettors, etc. The all-metal construction makes a hangar unnecessary for its protection.

Back firing of the engine tended to ignite and explode petrol from the carburettor which drained into the fuselage through air intakes having no outlet from the fuselage. Efforts were made, which were apparently successful, to eliminate fire hazard by installing air intake pipes leading from the pan under the crankcase to the outside of the aeroplane below the engine, thus directing back fires from outside the fuselage.

Breakage of dangerous gas lines was prevented by the installation of flexible hose connections. The petrol pump was firmly fastened at the bottom.

Holes were cut across the bottom of the fuselage at the bulkhead back of the engine to prevent the collection of petrol and oil in the fuselage.

Considering the fire hazard eliminated and that the aeroplane is flown only by good pilots familiar with its flying qualities, the JL-6 should be considered as an extremely important development, being very economical and efficient, having a remarkable performance and presenting features of construction having valuable possibilities.

J. A. MACREADY, 1st Lieut., A.S., Test Pilot

HAROLD R. HARRIS, 1st Lieut., A.S., Test Pilot

IN PARLIAMENT

Fleet Service

VISCOUNT CURZON on April 26 asked the Secretary of State for Air how many flying officers are now serving in the fully-commissioned ships in the Fleet; how many in aircraft carriers; what is the establishment of flying officers in each case; how many flights from fully-commissioned ships have been made since the 1st January, 1921; how many flights from aircraft carriers in the same period; and how many landings have been made on aircraft carriers in the same period?

The Secretary of State for Air: The answer to the first part of the question is one, and to the second part, twelve. The remainder of the flying officers for work in co-operation with the Fleet are borne on the establishment of the Royal Air Force Base at Leuchers, the establishment of which for 1921-22 is 51, but this will not be entirely filled until later in the year. In addition to these, there is another squadron engaged in co-operation with the Navy and available for embarkation. If the noble and gallant Lord is interested in these experiments I will show him full reports which deal with the latter parts of the question.

The Air Force

On Report of the resolution passed in Committee of Supply for an additional number of men for the Air Force, Lieut.-Com. Kenworthy, on May 2, urged that no case had yet been

presented for calling out the Air Force Reserve, and that they ought to be disbanded at the earliest possible moment.

Capt. Guest, Secretary of State for Air, said that the Air Force Reserve consisted of 250 officers and 5,800 of other ranks. He regretted to say that the current weekly expenditure was as much as £24,500. The Air Force was the only force capable of performing two very necessary duties—the carrying of mails to important centres, should the railways not be running and the road service being unsuitable, or inconvenient, and the carrying of urgent communications should there be anything wrong with the telegraph service. The Air Force did very important work in guarding Government stores. The risk of storming an aerodrome and destroying its inflammable stores would be so simple that nothing could be left to chance. Very generous leave was granted to the officers of the Reserve, who were highly skilled men technically, in order to enable them to make private arrangements with their employers.

Mr. White asked whether special leave meant that a man might return to his employment and not be called up again unless the situation became very much more serious than at present.

Capt. Guest, replying, said that the terms of leave were practically as suggested by Mr. White. The man was subject to recall should circumstances make it necessary.

The resolution was carried by 173 votes against 26.

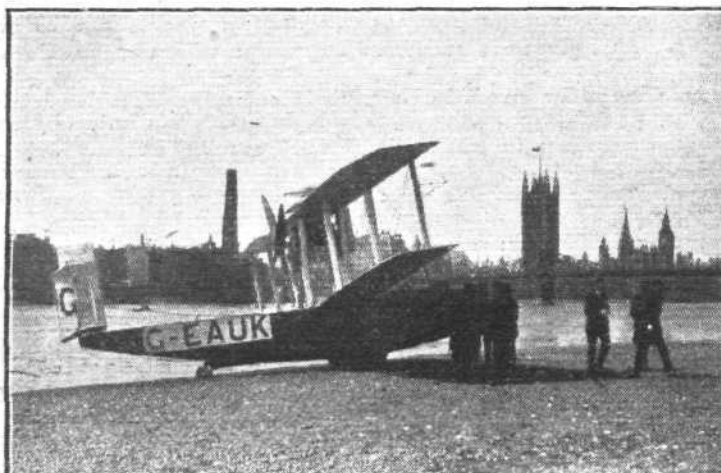


CROYDON AERODROME telephone number is Purley 1180, not Purley 595 and 999.

daily by air-service, in some cases early enough to be ready for *déjeuner*. Good!

H. G. HAWKER, riding a motor-cycle named after himself,

In another direction, just to show what can be done, the



LONDON (THAMES) TO PARIS (SEINE) : On April 29 the Vickers "Viking," 450 h.p. Napier "Lion" engine, flew, with Gen. Sykes and Col. Beatty on board, from the Thames at Westminster to the Seine in the centre of Paris, thus demonstrating the feasibility of a direct air service between the two cities, by means of which the delay of getting to and from the aerodrome is avoided. The machine left at 3.30 p.m., and arrived on the Seine at 6.20 p.m. On the following day the "Viking" returned from the Seine to Croydon aerodrome. Our photographs show the machine on the Hard outside Doulton's, and, on the right, Sir F. Sykes just aboard, ready for the trip.

is No. 1 on the list of entries in the Junior Tourist Trophy Race to be decided in the Isle of Man next month.

MORE *Times* enterprise. Regular Continental readers of the paper can now, by arrangement, receive their copies

Daily Mail of Monday, April 25, was despatched from London to Prague via the air service, reaching the Czecho-Slovakia capital on Tuesday morning, every copy being sold out immediately. The distance from London to Paris is 210 miles. From Paris to Prague by air-line is 550 miles. So that



Two Huff-Daland Biplanes: The HD-4 Army Training 'plane (top) and the "Early Bird" HD-1B twin-engine five-seater (bottom), constructed by Huff, Daland and Co., of Ogdensburg, N.Y. The former is a two-seater fitted with a 7-cylindrical A.B.C. "Wasp" (140 h.p.) or 9-cylindrical "Lawrence," and has a loading of 5.8 lbs./sq.ft. and 13.9 lbs./h.p. The latter, which has a useful load of 1,100 lbs., is fitted with two 10-cylindrical 100 h.p. "Anzani's," and its loading is 6.5 lbs./sq. ft. and 14.1 lbs./h.p.

the total distance covered was 760 miles by early on the morning following the day of issue.

ONE distinct disadvantage to an air-pilot having been drawn attention to by Sir Ross Smith the other day, when opening the Tobacco Fair at the Royal Horticultural Hall, Westminster, no doubt some ingenious inventor will now set to work to remedy the trouble. He is greatly intrigued that a pilot cannot smoke in an aeroplane. Something in the nature of the Davy lamp is his idea to remove this handicap. Some years ago we remember an entirely "closed-in" pipe that was submitted for our inspection by a Strand house. Whether that might help to a solution of the difficulty or not we hardly care to say, as naturally there must be some sort of air-opening, and that's where possible petrol fumes would take a hand.

FOLLOWING the invitation of tenders by the U.S. Government for "Pursuit Machines," as detailed in FLIGHT on

April 7 last, an order has, we learn, now been placed with the Boeing Airplane Co., Seattle, Wash., for 200 of these craft, and the L.W.F. Engineering Corp., College Point, N.Y., have secured an indent for 35 bombing planes. Is it by way of a "Chapuneasy" counterblast?

A WASHINGTON correspondent is responsible for the following:—

"After H. A. Renz, jun., aged twenty-two, an ex-soldier, had been unable to speak above a whisper for eight months, he recovered the full power of speech as the result of a flight at an altitude of 14,000 ft.

"The ex-soldier's voice, which left him one night whilst he was asleep, returned to the normal within an hour, and when he left the Army aeroplane at Bolling Field he was surprised to hear himself saying 'I don't know whether I can talk or not.'

"The flight was taken on medical advice."

The Coupe Deutsch de la Meurthe

THIS year's Coupe Deutsch competition is to be flown over a course somewhat longer than that of previous years, which have been of 200 kilometres. The new course is that of last year's Gordon Bennett race, from the Etampes aerodrome at Villesauvage to La Marmogne and back, a distance of 300 kilometres (186 miles). Landings and replenishments *en route* are permitted, as are also any repairs that may be necessary. Entries must reach the Aero Club de France before August 27. The machines must be at Villesauvage aerodrome by September 30. The race will take place between the hours of 9 a.m. and 6 p.m., on October 1. The Deutsch Prize consists of a cup valued 20,000 francs, and three prizes of 60,000 francs each for successive winners of the Cup.

The first holder of the Deutsch Cup was Emmanuel Helen, who on May 1, 1912, covered the distance of 200 kilometres (124 miles) in 1 hour 30 minutes (average speed 82.6 m.p.h.). In 1913, the Cup was won by Eugene Gilbert, whose time for the 200 kilometres was 1 hour 13 mins. 25 secs. (102 m.p.h.). Then came the War, and the next winner of the Cup was Sadi Lecointe, who, on January 3, 1920, covered the course at a speed of 266.3 kilometres (165 miles) per hour. This year it is likely that the 200 m.p.h. figure will be reached.

"Blimp" for Japan

ON April 27, the first non-rigid airship built for Japan in this country was launched at the Barrow works of Messrs. Vickers, Ltd. The airship is of the S.S. type, and her trial flight was entirely successful. She carried, in addition to the crew, several Japanese officers.

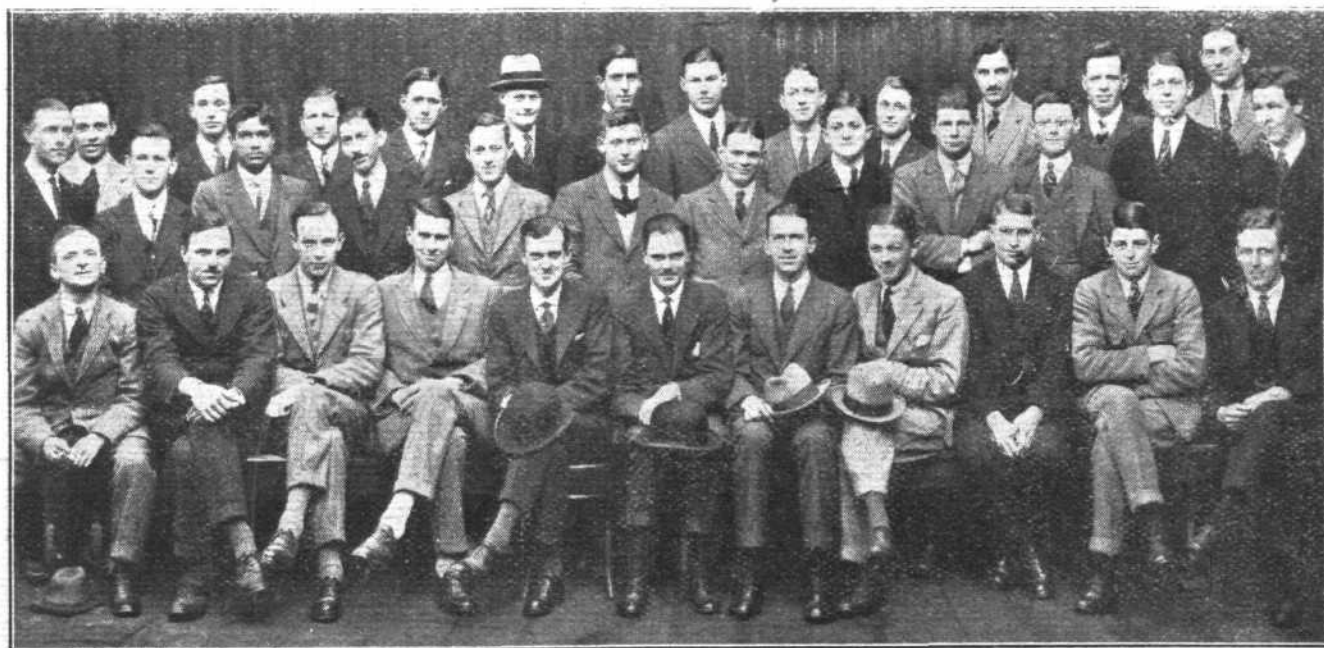
Warplanes at U.S. Naval Review

PRESIDENT HARDING was in Virginia last week, reviewing America's Atlantic Fleet of 50 fighting ships, with their auxiliaries, and a very imposing sight it must have been, judging by the accounts to hand; aircraft helped to impress in the display.

One correspondent describes how aeroplane bombers, De Havillands and Martins, from the Army station at Langley Field, circled overhead in mock attack, one of them carrying 2 tons of high explosives, while Navy seaplanes darted up and down as though to repel an enemy above. Single-seaters carrying 25 bombs, capable of flying 135 miles an hour, De Havillands carrying 100-lb. bombs, and Martins capable of carrying a ton of explosives, formed a formidable attacking fleet, at which the Navy sneered, maintaining that anti-aircraft guns and sea-planes are competent to deal with any peril from the air.

Coming Speed Monoplanes

FROM what can be gathered, it appears that the coming year will see the re-introduction of the monoplane for speed machines as well as for those intended for more leisurely travel. America has promised to show some "startlers" for the Pulitzer race which is to take the place of the Gordon-Bennett, and we now understand that at least three French constructors are contemplating designs for this race. Probably out of these at least two will be monoplanes, and it is quite on the boards that a retractable undercarriage will be one of the features of these projectiles. It would not be surprising if speeds of well over 200 m.p.h. were attained during the coming summer and autumn.



Some Members of Cambridge University Aeronautical Society during a visit to the Acton Works of the Napier Company, where they had a highly interesting and instructive experience, inspecting the 450 h.p. "Lion" and 1,000 h.p. "Cub" aero engines. The Secretary of the Society, Mr. Simmonds, speaking on behalf of the students, expressed great pleasure at what they had seen, and was delighted to find that despite the pessimism in many quarters as to British aviation, the Napier factory was so busy on aero engine construction.

ROYAL AERONAUTICAL SOCIETY NOTICES



Finance Committee.—The following gentlemen have been invited to serve on the Finance Committee for 1921-22:—Sir Mackenzie Chalmers, Lord Cowdray, Mr. J. B. Maclean, Maj.-Genl. Sir R. M. Ruck, Mr. A. E. Turner (hon. Treasurer), and Mr. F. P. Walsh.

Library.—The following books have been received and placed in the Library:—"A History of Aeronautics," by E. C. Vivian, and "The Dynamics of the Airplane," by

K. P. Williams.

W. LOCKWOOD MARSH,
Secretary

PERSONALS

Married

Air-Commodore CHARLES A. H. LONGCROFT, C.M.G., D.S.O., A.F.C., R.A.F., of Llanina, Cardiganshire, was married on April 27, at St. Paul's Church, Portman Square, to MARJORY, widow of Capt. W. D. HEPBURN, Seaforth Highlanders, and daughter of Mr. and Mrs. J. W. McKerrell-Brown.

To be Married

The engagement is announced between Mr. J. F. DAVISON, M.C., late R.A.F., elder son of Col. T. Davison, late 16th Lancers, and MARY, youngest daughter of the late Mr. Wm. CHALMERS CARMICHAEL, of Pietermaritzburg, Natal, South Africa, and Mrs. CARMICHAEL, of Innellan, Pietermaritzburg, and 130, Earl's Court Road, London, W. 8.

An engagement is announced between Capt. GEOFFREY FORREST HUGHES, M.C., A.F.C., only surviving son of Sir Thomas and Lady Hughes, Sydney, N.S.W., and MAGARET EYRE SEALY, younger daughter of the Rev. G. S. S. and Mrs. VIDAL, Barnsley Rectory, Cirencester.

The marriage is arranged, and will take place on Saturday, June 18, at the Parish Church, Chingford, between FREDERIC C. F. WALWIN (late Captain R.A.F.) and BEATRICE OLIVE, youngest daughter of Mr. and Mrs. F. A. BAGNALL, "Quercus," Chingford.

R.A.F. Golfing Association Meeting

At Sandy Lodge, a Spring meeting was carried through last week by officers of the R.A.F. Of the 60 entries, 53 competitors took out cards on the first day, April 26. In the team competition the R.A.F. "A" team (Uxbridge) won with a total of 252 (Group Captain A. G. Heirson, 83 net; Flight-Lieut. C. H. Hayward, 79; and Flight-Lieut. C. Lees, 90). The "B" team of the 4th Supply Depot (Ruislip) were second, with 259 points (Flight Officer Waters, 85; Flight Officer Bradley, 83; and Flight Officer Duffield, 91).

The best individual return was 77 + 2 = 79, by Flight-Lieut. Hayward. Wing-Com. Briggs was second in the Senior Division with a score of 92 - 9 = 83; while in the second division (handicaps 10 and over), Sqdn.-Ldr. Auken headed the list with 104 - 24 = 80.

The result of the four-ball foursomes against Bogey was:—Flying Officer Cooke (11) and Sqdn. Ldr. Shorten (18), 7 up; Flight-Lieut. Elliott (18) and Flight-Lieut. Robertson (4), 4 up; Sqdn. Ldr. Hewat (6) and Flight-Lieut. Barr-Sim (scratch), 3 up.

The best individual return was that of Sqdn. Ldr. Shorten (18), 3 up.

On April 27, the meeting was continued, the results being:—36 Holes Eclectic Competition.—First Division.—Flight-Lieut. Lees (8), 2 up. Second Division.—Sqdn. Ldr. Shorten (15), 6 up.

Best Morning Round.—First Division.—Sqdn. Ldr. Thomson (scratch), 2 down. Second Division.—Flight-Lieut. Elliott (18), 2 down.

Best Afternoon Round.—Sqdn. Ldr. Shorten (15), 1 up.

Reported Big U.S. Airship Scheme

An ambitious scheme for Airship Services is cabled from Washington, it being stated that a fifty million dollar corporation has been formed which proposes to have regular airship lines operating as soon as possible between all the principal cities of the United States, which sounds somewhat of a steep order. The first line proposed will be between New York and Chicago until the spring of 1922, and will then be extended to San Francisco, radiating throughout the country.

The present programme provides for 10 huge airships. The corporation has been organised by well-known engineers, supported by Government Departments of the Army, Navy, Post Office, and Commerce.

PUBLICATIONS RECEIVED

A History of Aeronautics. By E. C. Vivian and Lieut.-Col. W. Lockwood Marsh. London: W. Collins Sons and Co., Ltd., 48, Pall Mall, S.W. 1. Price 30s. net.

Report of the Canadian Air Board for the Year 1920. The Air Board, Ottawa, Canada.

Technical Note No. 53. Similitude Tests on Wing Surfaces. By H. Kumbach. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Report No. 99 Accelerations in Flight. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Report No. 101. The Calculated Performance of Airplanes Equipped with Supercharging Engines. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

NEW COMPANY REGISTERED

NATIONAL AIR TRANSPORT CO., LTD.—Capital £1,000, in £1 shares. Formed to carry on (subject to licence from H.M. Postmaster-General, where necessary) the business of carriers by air, steamship, motor and rail, in and between the British Isles and elsewhere. The first subscribers are H. S. Higginbottom and A. Bryning, who may appoint themselves to be directors. Solicitor: J. H. Baker, Lennox House, Norfolk Street, Strand, W.C.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; — I.C. internal combustion; m. = motors

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1919.

- Published May 5, 1921
16,609. E. BERTRAND. Aeroplane wings. (161,200.)
27,638. G. CLARK. Radiators for aeroplane, etc., engines. (161,220.)
32,494. A. FATHY. Helicopters. (161,240.)

APPLIED FOR IN 1920

- Published May 5, 1921
239. W. ZEROVEC. Cooling of revolving-cylinder I.C. engines. (137,334.)
287. L. T. BATES. Apparatus for navigating aircraft, etc. (138,321.)
7,187. CURTISS AEROPLANE AND MOTOR CORPORATION. Motor lubrication. (140,088.)
11,278. G. P. GRENPELL, J. ERSKINE-MURRAY and others. Radio-navigational systems. (161,448.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xi and xii).

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